

CLAIMS

- 1 1. A node for a telecommunications network, comprising:
- 2 a segmentation and reassembly module (SAR module) to perform segmentation
- 3 and reassembly (SAR) on ATM cells received by the node, said SAR module particularly
- 4 providing Virtual Channel Identifier (VCI) and Virtual Path Identifier (VPI) translation
- 5 (referred to as VCI/VPI translation) and having a direct memory access (DMA) mecha-
- 6 nism for a storage external to said SAR module, said SAR module performing a first
- 7 DMA access when said VCI/VPI translation are representative of an error code correct-
- 8 ing (ECC) procedure to be carried out in said node, and said SAR module performing a
- 9 second DMA access when said VCI/VPI translation correspond to a message that does
- 10 not require a local ECC procedure;
- 11 a coder/decoder module for performing an ECC procedure on cells; and,
- 12 a controller to control said coder/decoder module to perform an error correcting proce-
- 13 dure in response to the detection of said first DMA access.
- 1 2. The apparatus as in claim 1 wherein said SAR module further comprises:
- 2 a controller to perform said first DMA at a first address and to perform said sec-
- 3 ond DMA at a second address.
- 1 3. The apparatus as in claim 1 wherein said SAR module further comprises:
- 2 an address decoder to interpret VCI/VPI identifiers to control whether or not an
- 3 ECC procedure is done.
- 1 4. The apparatus as in claim 1 further comprising:

2 a dual-port first RAM storage having a first port designed to receive the data
3 transferred via DMA access from the internal circuitry of said SAR module, and having a
4 second port for transferring data to said coder/decoder module;

5 second RAM storage arranged in a FIFO organization for receiving the data proc-
6 essed by said coder/decoder module when the received message requires the need of an
7 ECC procedure, or the data directly extracted from said dual-port first RAM storage by
8 said controller when no ECC procedure is required;

9
10 an address decoder to detect whether said SAR means performs said first or said second
11 DMA access, and issuing a corresponding interrupt to said controller to control the per-
12 formance of said ECC procedure in response to detecting said interrupt.

1 5. The apparatus as in claim 1 further comprising:
2 logic circuit to load said SAR module with the parameters characterizing the number
3 of cells forming a full message for which an error correcting procedure applies.

1 6. The apparatus as in claim 1 further comprising:
2 a transmit part, said transmit part having a first dual-port RAM storage, said first
3 dual-port RAM storage having a first port connected to a processor and a second port;
4 a second dual-port RAM storage having a first port receiving the data coming ei-
5 ther from said coder/decoder module or said second port of said first storage, said second
6 dual-port RAM storage having a second port that can be accessed by said DMA mecha-
7 nism of said SAR module;
8 control to cause said second dual-port storage to be loaded with a payload of a message,
9 plus an additional payload containing a syndrome computed by said coder/decoder mod-
10 ule when an ECC mechanism is required, whereby the contents of all the payloads plus

11 said syndrome are transferred to said SAR module for reassembly prior to their transmis-
12 sion to a network.

1 7. The apparatus as in claim 1 further comprising:
2 a logic circuit to load said SAR module with the parameters characterizing the number of
3 cells forming a full message for which an error correcting operation applies.

1 8. The apparatus as in claim 1 further comprising:
2 said SAR module is initialized in order to process message of four cells, plus an addi-
3 tional fifth cell for conveying a syndrome computed by said coder/decoder module when
4 an ECC mechanism is required.

1 9. The apparatus as in claim 1 further comprising:
2 said coder/decoder module is a Reed-Solomon coder-decoder to perform an ECC proce-
3 dure.

1 10. The apparatus as in claim 1 further comprising:
2 said coder/decoder module is a Hamming coder and decoder to perform an ECC proce-
3 dure.

1 11. A node for a telecommunications network, comprising:
2 a segmentation and reassembly module (SAR module) to perform segmentation
3 and reassembly (SAR) on cells received by the node, said SAR module particularly pro-
4 viding Virtual Channel Identifier (VCI) and Virtual Path Identifier (VPI) translation (re-
5 ferred to as VCI/VPI translation) and having a direct memory access (DMA) mechanism
6 for a storage external to said SAR module, said SAR module performing a first DMA ac-
7 cess when said VCI/VPI translation are representative of an error code correcting (ECC)

8 procedure to be carried out in said node, and said SAR module performing a second
9 DMA access when said VCI/VPI translation correspond to a message that does not re-
10 quire a local ECC procedure;

11 a coder/decoder module for performing an ECC procedure on cells; and,
12 a controller to control said coder/decoder module to perform an error correcting proce-
13 dure in response to the detection of said first DMA access.

1 12. A node for a telecommunications network, comprising:

2 a segmentation and reassembly module (SAR module) to perform segmentation
3 and reassembly (SAR) on cells received by the node, said SAR module particularly pro-
4 viding Virtual Channel Identifier (VCI) and Virtual Path Identifier (VPI) translation (re-
5 ferred to as VCI/VPI translation) and having a direct memory access (DMA) mechanism
6 for a storage external to said SAR module, said SAR module performing a first DMA ac-
7 cess when said VCI/VPI translation are representative of an error code correcting (ECC)
8 procedure to be carried out in said node, and said SAR module performing a second
9 DMA access when said VCI/VPI translation correspond to a message that does not re-
10 quire a local ECC procedure;
11 means for controlling a coder/decoder module to perform an error correcting procedure in
12 response to the detection of said first DMA access.

1 13. A method for operating a node of a telecommunications network, comprising:

2 performing segmentation and reassembly by a segmentation and reassembly
3 module (SAR module) on ATM cells received by the node, said SAR module particularly
4 providing Virtual Channel Identifier (VCI) and Virtual Path Identifier (VPI) translation
5 (referred to as VCI/VPI translation) and having a direct memory access (DMA) mecha-

6 nism for a storage external to said SAR module, said SAR module performing a first
7 DMA access when said VCI/VPI translation are representative of an error code correct-
8 ing (ECC) procedure to be carried out in said node, and said SAR module performing a
9 second DMA access when said VCI/VPI translation correspond to a message that does
10 not require a local ECC procedure;

11 performing an ECC procedure on cells by a coder/decoder module; and,
12 controlling said coder/decoder module to perform an error correcting procedure in re-
13 sponse to the detection of said first DMA access.

1 14. A method for operating a node of a telecommunications network, comprising:
2 performing segmentation and reassembly by a segmentation and reassembly
3 module (SAR module) on cells received by the node;

4 providing Virtual Channel Identifier (VCI) and Virtual Path Identifier (VPI)
5 translation (referred to as VCI/VPI translation) by said SAR module;

6 storing data by said SAR module by a direct memory access (DMA) mechanism,
7 said SAR module performing a first DMA access when said VCI/VPI translation are rep-
8 resentative of an error code correcting (ECC) procedure to be carried out in said node,
9 and said SAR module performing a second DMA access when said VCI/VPI translation
10 correspond to a message that does not require a local ECC procedure;

11 performing an ECC procedure on cells by a coder/decoder module; and,
12 controlling said coder/decoder module to perform an error correcting procedure in re-
13 sponse to the detection of said first DMA access.

1 15. The method of claim 13 or claim 14 further comprising:

2 performing said first DMA at a first address and to performing said second DMA
3 at a second address.

1 16. The method of claim 13 or claim 14 further comprising:
2 interpreting VCI/VPI identifiers to control whether or not an ECC procedure is
3 done.

1 17. The method of claim 13 or claim 14 further comprising:
2 receiving at a first port of a dual-port first RAM storage the data transferred via
3 DMA access from the internal circuitry of said SAR module, and said first storage having
4 a second port for transferring data to said coder/decoder module;
5 receiving the data processed by said coder/decoder module at a second RAM stor-
6 age when the received message requires the need of an ECC procedure;
7 detecting whether said SAR means performs said first or said second DMA ac-
8 cess; and,
9 issuing a corresponding interrupt to said controller to control the performance of said
10 ECC procedure in response to detecting said interrupt.

1 18. The method of claim 13 or claim 14 further comprising:
2 loading said SAR module with the parameters characterizing the number of cells forming
3 a full message for which an error correcting operation applies.

1 19. The method of claim 13 or claim 14 further comprising:
2 initializing said SAR module in order to process a message of four cells, plus an addi-
3 tional fifth cell for conveying a syndrome computed by said coder/decoder module when
4 an ECC mechanism is required.

- 1 20. The method of claim 13 or claim 14 further comprising:
2 using a Reed-Solomon coder-decoder to perform said ECC procedure.
- 1 21. The method of claim 13 or claim 14 further comprising:
2 using a Hamming coder-decoder to perform said ECC procedure.
- 1 22. A computer readable media having instructions written thereon for execution in a
2 node to practice of the method of claim 13 or claim 14.
- 1 23. Electromagnetic signals propagating on a computer network, said electromagnetic
2 signals carrying information for execution in a node to practice of the method of claim 13
3 or claim 14.